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Reply to: Naftali Chayat, Chief Scientist
Alvarion Ltd.
21a HaBarzel st.
P.O.B. 13119
Tel Aviv 61131
ISRAEL

Tel: +972-3-6457801
Fax: +972-3-6456222
e-mail: Naftali.Chayat@Alvarion.com

In the Matter of	**)**	
	)	
Amendment of Part 15 of the Commission's	**)**	
Rules Regarding Spread Spectrum Devices	**)**	**ET Docket No. 99-231**
	)	
Wi-LAN, Inc	**)**	
Application for Certification of an Intentional	**)**	
Radiator Under Part 15 of The Commission's	**)**	**DA 00-2317**
Rules	**)**	

Alvarion Reply Comments on FNPRM 99-231

I. INTRODUCTION

Alvarion[1] is joining the support of introducing both Adaptive Frequency Hopping and Digital Modulation into the 15.247 set of rules. Our reply comments focus on the allowed power and spectral density levels.

II. Digital Modulation issue

We join the commenters supporting the introduction of Digital Modulation along with the Direct Sequence Spread Spectrum systems. This will obviate the Processing Gain definitions, with all the ambiguities involved. In particular, it will provide an

[1] Alvarion is a leading provider of Fixed Wireless Access equipment, as well as WLAN equipment. Alvarion is a result of merger (in August 2001) of BreezeCOM and Floware. Alvarion has 650 employees, of which 65 work in a US subsidiary. It has supplied hundreds of thousands ot units, majority of which are in license exempt bands. Our equipment is used by Wireless ISPs, enterprises, campuses, communities, school districs, municipalities, hospitals, ports, airports and more. In licence exempt bands we have both Frequency Hopping and Direct Sequence equipment. We intend to use OFDM based equipment both in ISM and in U-NII license exempt bands. We were active participants in IEEE 802.11 Wireless LAN standards committee, and currently we are participating in the IEEE 802.16 standartization activity for the Fixed Wireless Access.

appropriate regulatory framework for the 802.11b systems, which *de facto* have no processing gain (11 Mbit / sec data rate at 11 Mchip / sec spreading rate).

The original rules for DS systems state power limit of 1 Watt and spectral density limit of 8 dBm / 3 KHz (equivalently 33 dBm / MHz). The regulations envision both indoor and outdoor use, as exemplified by the sections dealing with directional antennae. Our view is that this power and spectral density limits should remain same for Digital Modulation systems.

The susceptibility of existing systems to interference depends mainly on total power rather than spectral density[2]. Comments by Agere[3] and IEEE802[4] advocate reduction of power density significantly when Digital Modulation (DM) is used. Agere advocates a 10 dBm / MHz limit; IEEE802 mentions a 20 dBm / MHz spectral density. Note that at 10 dBm / MHz even 10 MHz wide signal will have only 20 dBm power 10 dB less than with current regulations. With the 6dB antenna rule this implies 26 dBmi EIRP. Lower bandwidths will result in even more severe limitation. Note that even today 802.11b systems (in our view DM rather than DSSS) are used for outdoor Fixed Wireless Access at EIRP levels near the 36 dBmi limit mainly due to directional antennae. Restricting the spectral density in a way that will restrict the allowed EIRP will have a negative impact both on the FWA industry and on installed equipment. For those reasons we propose to retain the power and spectral density regulations for Digital Modulation systems same as for the DSSS systems. If the Committee chooses to limit the spectral density beyond current, in our view at least 25 dBm / MHz (corresponding to 1 Watt in a 3 MHz bandwidth) should be allowed.

III. Adaptive Frequency Hopping issue

We join the numerous commenters in support of the Adaptive Frequency Hopping rules. There are several issues related to Adaptive FH to which we would like to reply.

Some of the commenters, in particular Agere[5], claim that Adaptive FH needs to be a mandatory feature. There is a large installed base of well-performing FH systems proving that such feature certainly need not be mandatory. Moreover, Agere proposes to penalize Adaptive FH systems by reducing their power from 1 Watt to 125 mW, once the adaptive mode is exercised. Such severe restriction will remove any incentive to adapt the hopset of the FH system, since the range will be compromised.

We are supporting the Adaptive Frequency Hopping concept. The power allowed, in our view, needs to be related solely to the total bandwidth occupied by the FH

[2] BreezeCOM comments on NPRM 9-231, Oct. 4, 1999.
[3] Agere comments on FNPRM 9-231, Aug. 23, 2001.
[4] IEEE802 comments on FNPRM 9-231, Aug. 27, 2001.
[5] Agere comments on FNPRM 9-231, Aug. 23, 2001.

system. The rule we propose is that the instantaneous power shall be proportional to the total occupied bandwidth, with systems exceeding 75 MHz to be allowed 1 Watt. For example, a FH system occupying 30 MHz will be allowed 0.4 Watt. The rationale for the propose rule is that the probability of coincidence in time between a DSSS system and a FH system depends on the ratio of the DSSS bandwidth and the aggregate hopping bandwidth. For example, a 15 MHz wide DSSS system will be hit by a FH system hopping over 75 MHz 20% of the time, while a FH system hopping over 30 MHz will overlap the DSSS signal in 50% of the time in the worst case.

The text as proposed in FNPRM removes the mention of the ability to operate FH systems with channels wider than 1 MHz. This modification of the rules in August 2000 was a major achievement and it needs to be preserved. In addition, we see no reason not to apply same rules to the 5.8 GHz bands.

Therefore we propose the following text:

(a)(1)(ii) Frequency hopping systems operating in the 2400-2483.5 MHz and 5725-5850 MHz bands shall use a total span of at least 75 MHz. The maximum 20 dB bandwidth of the hopping channel is 5 MHz. The time of occupancy on any one channel shall be no greater than 0.4 seconds within the time period required to hop through all channels.

(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz and 5725-5850 MHz bands may utilize a total span of less than 75 MHz, but not less than 15 MHz, if their hopsets are intelligently modified in accordance with Section 15.247(g). Hopsets modified in this manner must be re-determined at least once every 30 seconds. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

(b)(1) for frequency hopping systems in the 2400-2483.5 MHz and 5725-5850 MHz bands may utilize a total span of at least 75 MHz: 1 Watt. For frequency hopping systems intelligently modifying their hopsets the power shall be reduced by the ratio of the total hopping span to 75 MHz.

IV. Extension of the upper U-NII band

We join the numerous commenters in support of the extension of the upper U-NII band to the 5725-5850 MHz range. This will introduce more regularity in the rules by allowing U-NII systems to behave similarly to ISM Digital Modulation systems.

Respectfully submitted,

Naftali Chayat